MDC Resource Science

Science Notes

Reaffirmed Occurrence of Two Vulnerable Caddisfly Species of Conservation Concern

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Background Information:

Maramec Spring is home to two Ozark endemic caddisfly Species of Conservation Concern (SOCC). The Missouri Glyphospsyche Caddisfly, *Glyphospsyche missouri,* (Critically Imperiled; State Rank-S1; Global Rank-G1) is known from Maramec Spring and the receiving spring branch and nowhere else in the world. Similarly, the Artesian Agapetus Caddisfly, *Agapetus artesus*, (Vulnerable; State Rank-S3 and Global Rank-G3) is known to occur only at Maramec Spring, Greer Spring, and a single reach of the Eleven Point River. Both species are considered representative fauna of Caves/Karst (Springs) habitat systems described in the Missouri State Wildlife Action Plan. However, little is known about distribution, life history, environmental requirements, or tolerance to environmental stress of either species. Further, prior to this study, it had been 14 years since *G. missouri* was last recorded to occur at Maramec Spring or the receiving spring branch, and 29 years since *A. artesus* was last documented to occur at Maramec Spring. On 15 November 2017, a team conducted reconnaissance of Maramec Spring Branch and of the Meramec River immediately downstream from the confluence of the spring branch to document occurrence and characterize aquatic habitat of immature life-stages (larvae and/or pupae) of the species, if found. A second visit was made on 10, January 2018.

Objectives:

- Determine if populations of *G. missouri* and *A. artesus* persist in Maramec Spring Branch;
- Characterize larval and/or pupal habitat of *G. missouri* and *A. artesus*, if found; and
- Obtain information on diet of *G. missouri* larvae, if found.

Reconnaissance Findings:

Early life-stages of *G. missouri* and *A. artesus* were found within two hours of searching at Maramec Spring Branch, during the initial visit. Approximately a dozen specimens were collected and released; six larvae of *G. missouri* and two larvae and one pupa of *A. artesus* were retained as voucher specimens. Two *G. missouri* specimens were dissected for dietary analysis (Table 1) and remaining vouchers were deposited at the University of Missouri Enns Entomological Museum.

Table 1. Digestive tract contents of Glyphospsyche missouri larvae (n=2) collected from Maramec Spring Branch on 15 November 2017.

Dominant Items	Subdominant Items
Ellerbeckia, Navicula, Vaucheria, Cocconeis, & Bryophyte (moss) leaf parts & protonema	*Achnanthes, Campylodiscus, Cymbella, Diatoma, Fragellaria, Frustulia, Gomphonema, Melosira, Nitzschia, Pinnularia, Pleurosigma, Anabaena, Batrachospermum, Meridion, Oscillatoria, Rhoicosphena, Synedra, Tabellaria & Tribonema*

Collected *G. missouri* and *A. artesus* were hand-picked from crevices near the bottom of submerged, moss and algal covered cobble and small boulder substrates with low embeddedness near the Maramec Spring Branch banks. Attempts to collect specimens with 500 µm mesh kick nets from finer substrates and vegetation, or by hand from large boulders at deeper depths in the spring branch, were unsuccessful as were attempts from multiple microhabitats at two locations in the Meramec River downstream from its confluence with the spring branch.

A second visit was conducted on 10 January 2018, to obtain aquatic vegetation samples, depth, current velocity, and substrate embeddedness measurements from two locations, one where the caddisfly specimens were found and one where they were not found in the Maramec Spring Branch during the initial visit (Table 2).

Table 2. Select parameters of two habitats at Maramec Spring Branch on 10 January 2018, where early life-stages of Glyphospsyche missouri and Agapetus artesus were sampled on 15 November 2017.

Habitat Parameter	Location - Specimens Collected	Location - Specimens Not Found
Current Velocity (m/s)	0.26	0.76
Depth (cm)	11.5	41.0
Dominant Substrate	cobbles & small boulders	large boulders & fine gravel
Substrate % Embeddedness	16.7	no data
Dominant Periphyton	*Closterium, Ellerbeckia, Melosira, Navicula & Vaucheria*	*Ellerbeckia, Melosira, Navicula, Pleurosigma & Vaucheria*
Dominant Bryophytes	*Fissidens, Fontinalis & Porella*	none
Dominant Macrophytes	*Lemna, Nasturtium & Veronica*	*Ceratophyllum & Myriophyllum*

Conclusion:

- Our efforts at Maramec Spring Branch reaffirmed that populations of *G. missouri* and *A. artesus* persist in the Maramec Spring Branch.
- We began to fill gaps in knowledge of the habitat of early life stages of these species and provided first documentation of the *G. missouri* larval diet.
- Continued management efforts to conserve and protect habitat combined with detailed studies of distribution, life history, and environmental requirements of these SOCC species are needed to inform progress of spring habitat system management identified in the State Wildlife Action Plan and the Department of Conservation's Comprehensive Conservation Wildlife Strategy, and to ensure maintenance of sustainable populations.

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